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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/717,624	11/21/2003	Richard Ullyott	2993-484US CMB/al	8610

32292 7590 06/23/2006

OGILVY RENAULT LLP (PWC)
1981 MCGILL COLLEGE AVENUE
SUITE 1600
MONTREAL, QC H3A 2Y3
CANADA

EXAMINER	
KIM, TAE JUN	

ART UNIT	PAPER NUMBER
3746	

DATE MAILED: 06/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/717,624	ULLYOTT, RICHARD	
	Examiner	Art Unit	
	Ted Kim	3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 May 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10,12-17 and 19-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10, 12-17, 19-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 05/12/2006 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-10, 12-17, 19-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Redinger, Jr. et al (4,069,662) in view of any of Falk (3,421,318), McArthur (6,209,309) and Nystrom (3,999,388). Redinger, Jr et al teach in a gas turbine engine, a method for controlling a gap between a rotor blade tip and a turbine shroud, said method comprising: determining a cooling air requirement for said shroud; and controlling a first portion of cooling air (e.g. upstream sections 36 in Fig. 4) admitted directly to said turbine shroud area by adjusting a duty cycle of a modulating signal according to said cooling air requirement (col. 4, lines 12+) by diverting a second portion

of said cooling air (downstream sections 36 in Fig. 4) to other components of the gas turbine engine; a valve 44 controlling an air passage for said cooling air and wherein said controlling a first portion of cooling air comprises controlling said valve; said valve is positionable in one of a fully open (on) position, when maximal air cooling results, and a fully closed (off) position, when no air cooling results; the valve control unit uses a signal representative an operating condition of said gas turbine engine for controlling said valve; said modulating signal determines the position of said valve; said duty cycle comprises a light cooling mode and heavy cooling mode, wherein less cooling air is provided to the turbine area in said light cooling mode than in said heavy cooling mode. As for said operating condition is dependent on at least one of an aircraft cycle condition of said gas turbine selected from the group consisting of start; take-off, run-up, landing, normal cruise, low-level cruise, high-level cruise, low speed cruise, high speed cruise, reverse thrust, climb and descent, applicant lists all the known operating conditions of the engine, and the control signal will inherently be taken at one of these operation conditions, note the system is not turned on when on the ground (col. 4, lines 40+). Redinger, Jr et al teach various aspects of the claimed invention including modulating the on-off valve but does not specifically teach a PWM valve. Falk teaches modulating flows with a PWM valve with a duty cycle (col. 1, lines 11+) is old and well known in the art. McArthur teaches using a PWM valve with a duty cycle is well known for its metering ability and low costs. Nystrom teaches using a PWM with a duty cycle solenoid controlled valve 37 to modulate a gas flow is old and well known in the art. It would have been obvious to

one of ordinary skill in the art to employ a PWM valve with a duty cycle for the on-off control of the clearance control air, due to its low costs and/or flow modulating abilities and/or precise metering abilities. As for the duty cycles being between 0-50% in light cooling and 50-100% in heavy cooling, this is well known in the art as an obvious matter of using the workable ranges in the art. It would have been obvious to one of ordinary skill in the art to employ the claimed ranges as an obvious matter of finding the workable ranges in the art.

4. Claims 1-10, 12-17, 19-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Franconi et al (6,910,851) in view of any of Falk (3,421,318), McArthur (6,209,309) and Nystrom (3,999,388). Franconi et al teach in a gas turbine engine, a method for controlling a gap between a rotor blade tip and a turbine shroud, said method comprising: determining a cooling air requirement for said shroud; and controlling a first portion of cooling air (e.g. flow from 318 to the high pressure turbine shroud, see col. 7, lines 46+) admitted directly to said turbine shroud area by adjusting a modulating signal according to said cooling air requirement (col. 7, lines 62+) and diverting a second portion (e.g. flow in 320 to the low pressure section) of said cooling air to other components of the gas turbine engine; a valve 302 controlling an air passage for said cooling air and wherein said controlling a first portion of cooling air comprises controlling said valve; said valve is positionable in one of a fully open (on) position, when maximal air cooling results, and a fully closed (off) position, when no air cooling results; the valve control unit 354 uses a signal representative an operating condition of

said gas turbine engine for controlling said valve; said modulating signal determines the position of said valve; said duty cycle comprises a light cooling mode and heavy cooling mode, wherein less cooling air is provided to the turbine area in said light cooling mode than in said heavy cooling mode; said operating condition is dependent on at least one of an aircraft cycle condition of said gas turbine selected from the group consisting of start, take-off, run-up, landing, normal cruise, low-level cruise, high-level cruise, low speed cruise, high speed cruise, reverse thrust, climb and descent (see col. 7, lines 62+; col. 8, lines 4+). The valve is a solenoid valve and as such would appear to inherently have a duty cycle. Alternately, Falk teaches modulating flows with a PWM valve with a duty cycle (col. 1, lines 11+) is old and well known in the art. McArthur teaches using a PWM valve with a duty cycle is well known for its metering ability and low costs. Nystrom teaches using a PWM with a duty cycle solenoid controlled valve 37 to modulate a gas flow is old and well known in the art. It would have been obvious to one of ordinary skill in the art to employ a PWM valve with a duty cycle for the on-off control of the clearance control air, due to its low costs and/or flow modulating abilities and/or precise metering abilities. As for the duty cycles being between 0-50% in light cooling and 50-100% in heavy cooling, this is well known in the art as an obvious matter of using the workable ranges in the art. It would have been obvious to one of ordinary skill in the art to employ the claimed ranges as an obvious matter of finding the workable ranges in the art.

5. Claims 1-10, 12-17, 19-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 58-214603 in view of any of Falk (3,421,318), McArthur (6,209,309) and Nystrom (3,999,388). JP '603 teaches in a gas turbine engine, a method for controlling a gap between a rotor blade tip and a turbine shroud, said method comprising: determining a cooling air requirement for said shroud; and controlling a first portion of cooling air 16 admitted directly to said turbine shroud area via 16t-1 by adjusting a modulating signal according to said cooling air requirement and diverting a second portion of said cooling air (e.g. via 16t-2 or 16c-1, 16c-2) to other components of the gas turbine engine; a valve 16t-1, controlling an air passage for said cooling air and wherein said controlling a first portion of cooling air comprises controlling said valve; said valve is positionable in one of a fully open (on) position, when maximal air cooling results, and a fully closed (off) position, when no air cooling results; the valve control unit 20 uses a signal representative an operating condition of said gas turbine engine for controlling said valve; as for said operating condition is dependent on at least one of an aircraft cycle condition of said gas turbine selected from the group consisting of start; take-off, run-up, landing, normal cruise, low-level cruise, high-level cruise, low speed cruise, high speed cruise, reverse thrust, climb and descent, applicant lists all the known operating conditions of the engine, and the control signal will inherently be taken at one of these operation conditions, note the system is not turned on when on the ground (col. 4, lines 40+).said modulating signal determines the position of said valve; said duty cycle comprises a light cooling mode and heavy cooling mode, wherein less cooling air is

provided to the turbine area in said light cooling mode than in said heavy cooling mode. The valve is a solenoid valve and as such would appear to inherently have a duty cycle. Alternately, Falk teaches modulating flows with a PWM valve with a duty cycle (col. 1, lines 11+) is old and well known in the art. McArthur teaches using a PWM valve with a duty cycle is well known for its metering ability and low costs. Nystrom teaches using a PWM with a duty cycle solenoid controlled valve 37 to modulate a gas flow is old and well known in the art. It would have been obvious to one of ordinary skill in the art to employ a PWM valve with a duty cycle for the on-off control of the clearance control air, due to its low costs and/or flow modulating abilities and/or precise metering abilities. As for the duty cycles being between 0-50% in light cooling and 50-100% in heavy cooling, this is well known in the art as an obvious matter of using the workable ranges in the art. It would have been obvious to one of ordinary skill in the art to employ the claimed ranges as an obvious matter of finding the workable ranges in the art.

6. Claims 1-10, 12-17, 19-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wilson et al (6,925,814) in view of any of Falk (3,421,318), McArthur (6,209,309) and Nystrom (3,999,388). Wilson et al teach the claimed invention (compare the figures with the instant applicant) including a valve 60 but with the exception of a duty controlled solenoid valve but Wilson et al do provide for the valve taking on any suitable valving scheme and its control (col. 7, lines 27+). Falk teaches modulating flows with a PWM valve with a duty cycle (col. 1, lines 11+) is old and well known in the art. McArthur teaches using a PWM valve with a duty cycle is well known for its metering

ability and low costs. Nystrom teaches using a PWM with a duty cycle solenoid controlled valve 37 to modulate a gas flow is old and well known in the art. It would have been obvious to one of ordinary skill in the art to employ a PWM valve with a duty cycle for the on-off control of the clearance control air, due to its low costs and/or flow modulating abilities and/or precise metering abilities. As for the duty cycles being between 0-50% in light cooling and 50-100% in heavy cooling, this is well known in the art as an obvious matter of using the workable ranges in the art. It would have been obvious to one of ordinary skill in the art to employ the claimed ranges as an obvious matter of finding the workable ranges in the art.

Double Patenting

7. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

8. Claims 1-10, 12-17, 19-22 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-7 of U.S. Patent No. 6,925,814 in view of any of Falk (3,421,318), McArthur (6,209,309) and Nystrom (3,999,388) and optionally further in view of Redinger, Jr. et al (4,069,662). US Patent 6,925,814 teaches all the claimed features of the invention except the valve being duty controlled solenoid valve. Falk teaches modulating flows with a PWM valve with a duty cycle (col. 1, lines 11+) is old and well known in the art. McArthur teaches using a PWM valve with a duty cycle is well known for its metering ability and low costs. Nystrom teaches using a PWM with a duty cycle solenoid controlled valve 37 to modulate a gas flow is old and well known in the art. It would have been obvious to one of ordinary skill in the art to employ a PWM valve with a duty cycle for the on-off control of the clearance control air, due to its low costs and/or flow modulating abilities and/or precise metering abilities. As for the duty cycles being between 0-50% in light cooling and 50-100% in heavy cooling, this is well known in the art as an obvious matter of using the workable ranges in the art. It would have been obvious to one of ordinary skill in the art to employ the claimed ranges as an obvious matter of finding the workable ranges in the art. The claims of the patent do not indicate how the valve is controlled. Redinger Jr. et al teach a valve 44 controlling an air passage for said cooling air and wherein said controlling a first portion of cooling air comprises controlling said valve; said valve is positionable in one of a fully open (on) position, when maximal air cooling results, and a fully closed (off) position, when no air cooling results; the valve control unit uses a signal representative an

operating condition of said gas turbine engine for controlling said valve; said modulating signal determines the position of said valve; said duty cycle comprises a light cooling mode and heavy cooling mode, wherein less cooling air is provided to the turbine area in said light cooling mode than in said heavy cooling mode. As for said operating condition is dependent on at least one of an aircraft cycle condition of said gas turbine selected from the group consisting of start; take-off, run-up, landing, normal cruise, low-level cruise, high-level cruise, low speed cruise, high speed cruise, reverse thrust, climb and descent, applicant lists all the known operating conditions of the engine, and the control signal will inherently be taken at one of these operation conditions, note the system is not turned on when on the ground (col. 4, lines 40+). It would have been obvious to one of ordinary skill in the art to employ the control scheme of Redinger, Jr. et al in order to provide for adequate control over the turbine shroud cooling.

Response to Arguments

9. Applicant's arguments filed 05/12/2006 have been fully considered but they are not persuasive. Applicant's arguments indicate that there was agreement during the interview that the claims as amended presently would avoid the prior art of record. Furthermore, the specification clearly indicates that the air that is diverted can still cool the turbine, i.e. the low pressure turbine; hence, applicant's arguments that this air is not referring to the components of the turbine appears misdirected. However, the examiner did not agree that this specifically chosen claim language would distinguish over the art of record as applicant did not make the proposed amendments at the time reflecting the

changes now set forth. Rather, the box on the interview summary was clearly marked that "agreement was not reached." As applied above, the art referenced above still applies to the outstanding claims of record. The Pellow reference was been withdrawn as its teachings are merely additive.

Contact Information

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Ted Kim whose telephone number is 571-272-4829. The Examiner can be reached on regular business hours before 5:00 pm, Monday to Thursday and every other Friday.

The fax numbers for the organization where this application is assigned are 571-273-8300 for Regular faxes and 571-273-8300 for After Final faxes.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Thorpe, can be reached at 571-272-4444.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist of Technology Center 3700, whose telephone number is 703-308-0861. General inquiries can also be directed to the Patents Assistance Center whose telephone number is 800-786-9199. Furthermore, a variety of online resources are available at http://www.uspto.gov/main/patents.htm

Ted Kim	Telephone	571-272-4829
Primary Examiner	Fax (Regular)	571-273-8300
June 21, 2006	Fax (After Final)	571-273-8300
Technology Center 3700 Receptionist	Telephone	703-308-0861
Patents Assistance Center	Telephone	800-786-9199